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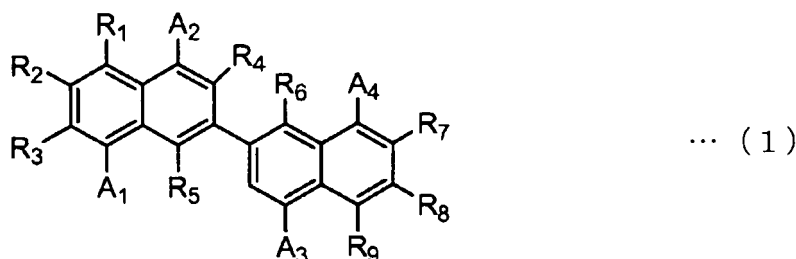
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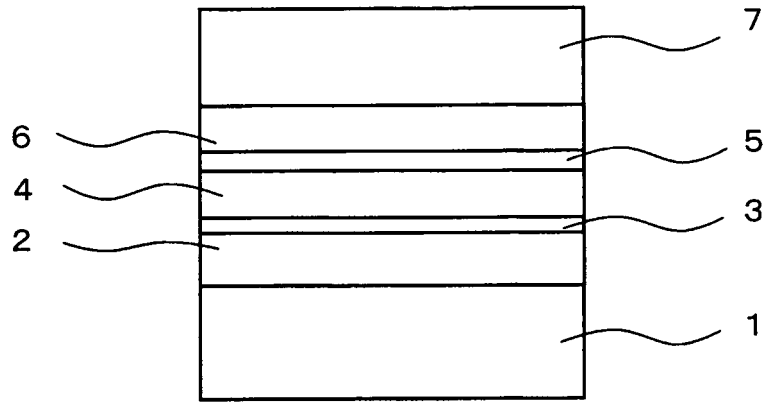
(54) **Organic electroluminescence material and element using the same**

(57) An organic EL element having one or a plurality of organic layers including a light emitting layer between a pair of electrodes is arranged such that at least one layer of the above-mentioned organic layers contains a compound as expressed by the following general formula (1) independently or as a mixture.



(where R₁-R₉ are selected from the group consisting of hydrogen, an alkyl group, a cycloalkyl group, an alkoxy group, a cycloalkoxy group, and an aryloxy group, and they may be the same groups or the groups different from one another, and A₁-A₄ are selected from the group consisting of a phenyl group which is either substituted or unsubstituted and a 5 or 6 member heterocyclic ring group which is either substituted or unsubstituted, and they may be the same groups or the groups different from one another.)

Fig. 1





EUROPEAN SEARCH REPORT

Application Number
EP 08 02 1923

DOCUMENTS CONSIDERED TO BE RELEVANT				
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)	
A	US 2005/175857 A1 (COGGAN JENNIFER A [CA] ET AL) 11 August 2005 (2005-08-11) * paragraphs [0014], [0015], [0022] * * compounds 26,27 * * claims 1,2 *	1-4	INV. C09K11/06	
A	WO 2007/046658 A (LG CHEMICAL LTD [KR]) 26 April 2007 (2007-04-26) * paragraphs [0001], [0010] - [0012], [0017], [0018] * * claims 1-15 *	1-4		
A	EP 1 565 041 A (IDEMITSU KOSAN CO [JP]) 17 August 2005 (2005-08-17) * page 15; compound 1 *	1-4		
A	EP 1 246 510 A (IDEMITSU KOSAN CO [JP]) 2 October 2002 (2002-10-02) * page 5; compound 4 *	1-4		
A	EP 1 695 952 A (IDEMITSU KOSAN CO [JP]) 30 August 2006 (2006-08-30) * page 4; compound F *	1-4		TECHNICAL FIELDS SEARCHED (IPC)
A	EP 0 849 979 A (TDK CORP [JP]) 24 June 1998 (1998-06-24) * page 7; compound III *	1-4		C09K
A	WO 2007/050303 A (EASTMAN KODAK CO [US]; BEGLEY WILLIAM JAMES [US]; HATWAR TUKARAM KISAN) 3 May 2007 (2007-05-03) * page 29; compounds CPD-14 *	1-4		
A	WO 2006/138075 A (EASTMAN KODAK CO [US]; BEGLEY WILLIAM JAMES [US]; HATWAR TUKARAM KISAN) 28 December 2006 (2006-12-28) * page 28; compounds CPD-14 *	1-4		
-/--				
The present search report has been drawn up for all claims				
4	Place of search The Hague	Date of completion of the search 8 June 2009	Examiner Ziegler, Jan	
CATEGORY OF CITED DOCUMENTS		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document		
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EUROPEAN SEARCH REPORT

Application Number
EP 08 02 1923

DOCUMENTS CONSIDERED TO BE RELEVANT			
Category	Citation of document with indication, where appropriate, of relevant passages	Relevant to claim	CLASSIFICATION OF THE APPLICATION (IPC)
A	EP 1 652 902 A (SEMICONDUCTOR ENERGY LAB [JP]) 3 May 2006 (2006-05-03) * page 22; compound 88 * -----	1-4	
			TECHNICAL FIELDS SEARCHED (IPC)
The present search report has been drawn up for all claims			
Place of search The Hague		Date of completion of the search 8 June 2009	Examiner Ziegler, Jan
CATEGORY OF CITED DOCUMENTS X : particularly relevant if taken alone Y : particularly relevant if combined with another document of the same category A : technological background O : non-written disclosure P : intermediate document		T : theory or principle underlying the invention E : earlier patent document, but published on, or after the filing date D : document cited in the application L : document cited for other reasons & : member of the same patent family, corresponding document	

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EPO FORM 1503 03.02 (P04C01)

ANNEX TO THE EUROPEAN SEARCH REPORT
ON EUROPEAN PATENT APPLICATION NO.

EP 08 02 1923

This annex lists the patent family members relating to the patent documents cited in the above-mentioned European search report. The members are as contained in the European Patent Office EDP file on
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08-06-2009

Patent document cited in search report	Publication date	Patent family member(s)	Publication date
US 2005175857 A1	11-08-2005	EP 1580250 A2	28-09-2005
		JP 2005222948 A	18-08-2005
WO 2007046658 A	26-04-2007	CN 101291897 A	22-10-2008
		EP 1937616 A1	02-07-2008
		JP 2009514812 T	09-04-2009
		KR 20070043666 A	25-04-2007
		KR 20080103953 A	28-11-2008
		US 2007108892 A1	17-05-2007
EP 1565041 A	17-08-2005	WO 2004047499 A1	03-06-2004
		JP 2004221045 A	05-08-2004
		KR 20050086729 A	30-08-2005
		US 2006043859 A1	02-03-2006
EP 1246510 A	02-10-2002	CN 1397147 A	12-02-2003
		WO 0243448 A1	30-05-2002
		JP 2002164178 A	07-06-2002
		TW 516337 B	01-01-2003
		US 2002136922 A1	26-09-2002
EP 1695952 A	30-08-2006	CN 1894179 A	10-01-2007
		JP 2005170911 A	30-06-2005
		WO 2005056505 A1	23-06-2005
		KR 20060134956 A	28-12-2006
		US 2007106103 A1	10-05-2007
EP 0849979 A	24-06-1998	JP 3297619 B2	02-07-2002
		JP 10177895 A	30-06-1998
		US 6121726 A	19-09-2000
WO 2007050303 A	03-05-2007	EP 1940995 A1	09-07-2008
		JP 2009514217 T	02-04-2009
		US 2007092755 A1	26-04-2007
WO 2006138075 A	28-12-2006	EP 1891692 A2	27-02-2008
		JP 2008547196 T	25-12-2008
		KR 20080025371 A	20-03-2008
		US 2006286405 A1	21-12-2006
EP 1652902 A	03-05-2006	CN 1769251 A	10-05-2006
		US 2006093857 A1	04-05-2006

EPO FORM P0459

For more details about this annex : see Official Journal of the European Patent Office, No. 12/82